A Poor Man's Lathe Duplicator Rig

by Ken Grunke

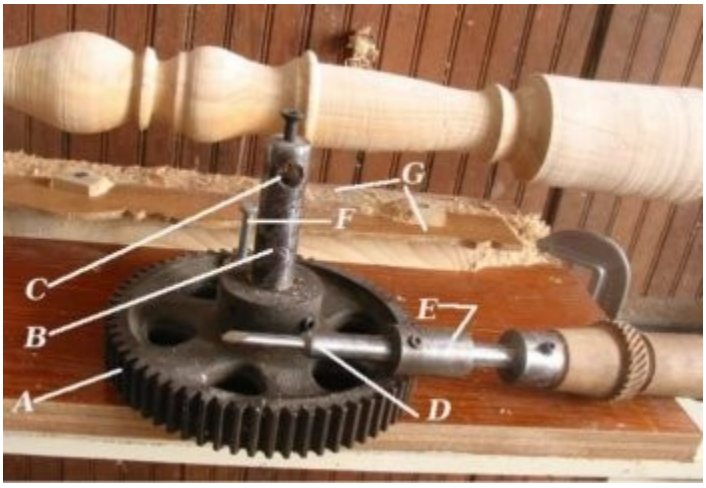
Inspired by Don Derry's adaption of Marco Berara's design, which Don posted in the **WoW File Cabinet** on Jan. 28, 2007. After seeing that rig, my version was hastily cobbled together using spare parts from my scrap bins. Easily put together using salvaged/found parts, or purchased off the shelf.

The rig slides around on a plywood platform, blocked up on the lathe bed to get the tool's tip in the ballpark of lathe center. Here it's just C-clamped to the lathe bed, but carriage bolts and wingnuts would be an improvement if you have access to the bottom area of the lathe bed. The toolpost has vertical adjustment of 1" to set the tool's cutting edge on center. This gives a range of 2" on the diameter—I can move the rig from a 10" mini-lathe to my Jet 1236 with only a small adjustment, and it can be fit on any size lathe with appropriately sized blocks under the platform.

In theory, you should be able to approach the work from any angle, but only if the profile of the tool and the follower pin match each other. I didn't bother with this in the trial run, but if a round follower pin is used, the tool's tip should be round with the same radius. By the same token, if a pointed tool is used, the follower pin would be wedge-shaped. The tool profile is a basic round-nosed skewchigouge shape and is a ¼" round HSS bit epoxied into the end of a ½" mild steel shaft held in my setscrew handle.

Part A:

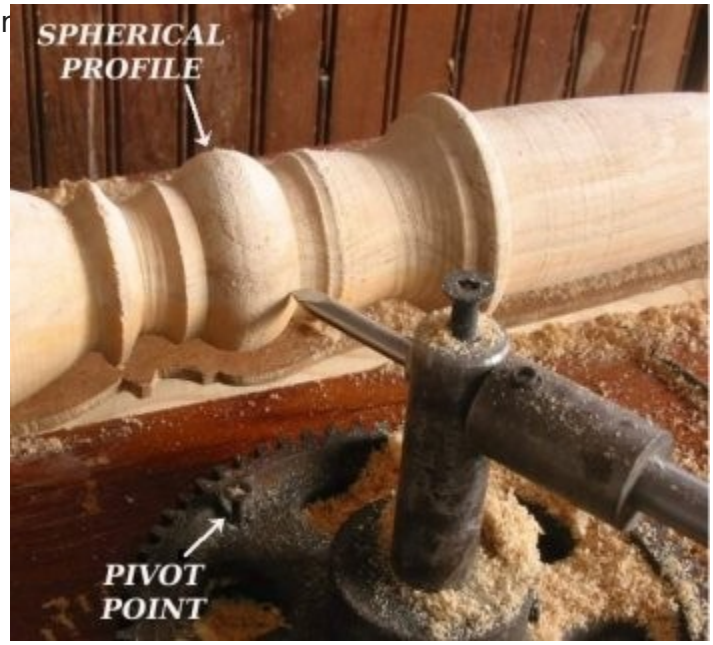
The backbone of this rig is the tool holding base, which can be any fairly heavy sprocket wheel, gear, pulley, faceplate, or similar item, 4-6" diameter. I am using a cast iron gear with a ⅞" bore—a bore size of ¾" to 1" will do just fine. The base holds the toolpost (Part B), crossdrilled (C) to take the tool shaft (D). I added a setscrew collar (E) to the toolshaft to enable repeat accuracy of tool depth if it's necessary to remove tool shaft from toolpost.



The tool in use:

First of all, the tool's tip needs to be aligned over the follower pin (F) as close as possible, using either line of sight or an alignment gauge of some kind. Then, the pattern (G) has to be situated into position underneath the spindle blank. There is some leeway here, at least front-to-back, as the tool itself can be moved in or out for fine adjustments.

This rig can also be used to cut spher gear base pivoting around a screw driven into the base. I left the setscrew loose at the top of the toolpost, so the tool can be progressively advanced into the cut, and also rotated left or right. Alternatively, the same follower pin used for regular duplication can be used as a pivot in a notch or hole cut in a template.



Observations:

I wasn't very impressed with the speed of using this setup—it's somewhat cumbersome. I couldn't help but think how much faster I could turn a shape freehand using a skew and gouge if I weren't restrained by a jig, and if I didn't need an exact profile. So I wouldn't call this technique a great time saver, although the roughing out may go quicker than with hand tools. That is how I view any duplicating rig, as a roughing setup—especially since, as with most other duplicators, it's hard to get a nice finished tool surface using this rig, so one should plan on doing a little finish work with hand tools.

Is it worth the trouble to construct?: Sure, why not—considering that it doesn't take any skilled machining, and uses off-the-shelf parts that can be put together in half a day's time if all goes well. I haven't had the opportunity to put it through it's paces on any multiple spindle turning job, but I have a feeling it can prove useful and it's cheap!

Improvements to make: This rig doesn't slide around very easily on the platform, so I would make the platform from laminated MDF such as countertop material, and glue a sheet of slick plastic to the bottom of the gear. A sturdier template is also necessary—this hardboard probably wouldn't last for more than a dozen copies at the most.